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Bowman

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :
Clement W. BOWMAN :
: Group Art Unit: 2nd

Serial No.: 09/240,053 : Examiner: Kalinowski

Filed: January 29, 1999 :

For: COMPUTERIZED PROCESS FOR MEASURING THE VALUE OR PERFORMANCE OF AN ORGANIZATION OR INTANGIBLE ASSET

DECLARATION OF DR. JOHN C. BOWMAN UNDER 37 C.F.R. SECTION 1.132

Honorable Commissioner of
  Patents and Trademarks
Washington, D.C. 20231

SIR:

     I, Dr. John C. Bowman, declare and say as follows:

     I am a citizen of Canada and reside at 11437 76 Avenue, Edmonton, Alberta, Canada.

     I have reviewed U.S. Patent 3,628,904 (Canguilhem) and an evaluation method known in the literature as the Managerial Grid (Blake) as they pertain to the specification and claims of U.S. Patent Application Serial No. 09/240,053 (Bowman).

     I am an Associate Professor of Mathematical and Statistical Sciences at the University of Alberta (Canada). I have a B.S.Eng. in Engineering Physics from the University of Alberta and an M.A. and Ph.D. in Astrophysical Sciences from Princeton University. I have previously completed postdoctoral research contracts at the University of
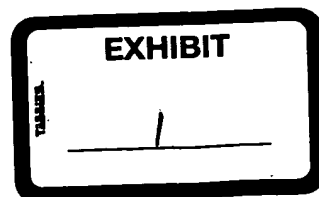
Toronto (Canada), The University of Texas at Austin (USA), and the Max-Planck-Institut für Plasmaphysik (Germany), which involved advanced mathematical theory and scientific computation. My publications in scientific research journals can be viewed at the web site www.math.ualberta.ca/~bowman/.

Canguilhem's patent is based on the elementary Euclidean notion of distance taught in any freshman university linear algebra course. However, his patent is cluttered with unnecessary nomenclature and nonessential distinctions. As a result, and judging by the lack of citations of this work in standard mathematics and scientific databases (e.g. American Mathematical Society MathSciNet and Web of Science), it appears that his essential idea has remained inaccessible to skilled practitioners in the field. To help understand what Canguilhem has disclosed and its relation to the Bowman patent application, I have prepared the following summary of his method.[1]

1. The basic principle of *dimensional synthesis* enunciated by Canguilhem is a method for constructing a one-dimensional ranking of intangible assets. The inventor distinguishes between extrinsic quantities (*vector model elements*), which scale linearly with the size of the system, and intrinsic attributes (*point elements*), which do not scale with system size (page 6). He points out that intrinsic quantities are not absolute; only their differences with respect to a fixed reference value have meaning. To treat both types of these *factors* on an equal footing, he first subtracts an appropriate reference value from each of the intrinsic quantities.

2. Canguilhem identifies each of N such quantitative factors with a unique orthogonal basis vector of an N-dimensional vector space, as he illustrates for the case $N = 2$ in Figures 4, 7, and 10. He then considers the restricted case where the *product value* depends on only L of these factors (page 7–8). These factors form an L-dimensional linear subspace (*subordinate vector space*) of the full vector space. He assigns each

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[1]Definitions for some of the mathematical terms used in this analysis can be found in the online mathematics dictionary at the *Mathematica* web site http://mathworld.wolfram.com and also in the online linear algebra textbook available at http://joshua.smcvt.edu/linalg.html.

of these determining factors f_ℓ a weight (*hierarchical coefficient*) k_ℓ according to their relative significance, where $\ell = 1, 2, \ldots, L$. However, he does not give any prescription for how to determine these weights since "the hierarchy established among the characteristic factors of a single product value is obviously peculiar to the individual establishing it and a function of a given purpose" (page 7, line 52).

To account for the relative importance of each factor in determining the overall product value, Canguilhem rescales each variable f_ℓ by scaling factors p_ℓ, which are inversely proportional to the hierarchical coefficients k_ℓ (page 9, line 71), to obtain the rescaled factors (page 10, line 51)

$$\xi_\ell = \frac{f_\ell}{p_\ell}.$$

He then defines the product value ν as a *single number* (page 12, line 54) determined by the L scaled factors ξ_ℓ, using the usual L_2 Euclidean norm (measure of distance):

$$\nu = \sqrt{\sum_{\ell=1}^{L} \xi_\ell^2}.$$

This corresponds to the length of the vector between the origin and the point $(\xi_1, \xi_2, \ldots \xi_L)$ in a transformed space where each axis is *independently* stretched by a corresponding factor $1/p_\ell$, to account for its relative importance toward the overall product value. Only a trivial diagonal transformation[2] is used to weight the factors prior to calculating this root-mean-square product value.

3. Canguilhem's technique is a special case of the method that the Bowman patent application uses to calculate product values. In the Bowman method, every factor can contribute to *each* of the L objective axes, *via* a much more general transformation:

$$\xi_\ell = \sum_{i=1}^{N} a_{\ell i} f_i, \tag{1}$$

where each of the coefficients $a_{\ell i}$ measures the contribution that the factor f_i makes to the objective ξ_ℓ. That is, the objective variables ξ_ℓ are general *linear combinations* of the original N factors f_i; they are not simply scaled multiples of quantitative factors

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[2]See the diagonal matrix on lines 40–45 of page 10; note the typographical error: $P \to p$.

(as in Canguilhem's method). The proprietary content of the Bowman method is the means it provides for determining these general $L \times N$ weights.

The special case of the diagonal transformation matrix given on page 10 (lines 40–45), corresponds to the choice

$$a_{\ell i} = \begin{cases} \dfrac{1}{p_\ell} & \text{if } \ell = i, \\ 0 & \text{if } \ell \neq i. \end{cases}$$

In this restricted case, the Bowman method reduces to Canguilhem's method. Even in this context, however, I emphasize again that the Canguilhem patent still provides no method for determining the underlying hierarchical coefficients k_ℓ used to determine the diagonal entries $1/p_\ell$ of the transformation.

Typically, Bowman uses $L = 2$ or $L = 3$ objective axes, so that the L independent goals can be readily visualized graphically. This is a substantial improvement over the method of Canguilhem, in that it provides two- or three-dimensional output, rather than simply ranking candidates according to some one-dimensional norm. Equation (1) is illustrated for $L = 2$ in Figure 3 of the Bowman patent application (and described on pages 9 and 10). The f_i factors are the Number Ratings in the third column of Figure 3 for the $N = 37$ Criteria statements. For $\ell = 1$, the value a_{1i} in Equation (1) corresponds to the X weight (fourth column in Figure 3) for factor i divided by the sum of all X weights (for convenience these values are then scaled by an overall constant, such as $10/3$), as described on page 10. For $\ell = 2$, the value a_{2i} corresponds to the Y weight for factor i normalized to the sum of all Y weights (and scaled by the same constant). The $L = 2$ product values are the sums of the contributions to the respective objective axes X and Y in Figure 4a. In this example, the number of independent objective axes L is 2; however, as seen in Equation (1) and noted on page 6 of the Bowman patent application, the number of independent axes can be greater than 2.

The Canguilhem patent teaches how to assign a value to an object by assessing the relative importances of various predetermined factors to obtain an overall one-dimensional ranking. The result is a single number. Although he begins with an N-dimensional vector

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space (illustrated for $N = 2$ in Figures 4, 7, and 10), Canguilhem's method provides only a one-dimensional measure of a set of weighted factors.

The Blake Managerial Grid typically provides two such one-dimensional measures, a *task* measure reflecting the sum of scores on questions that address only the tendency to be mission-oriented and a *people* measure reflecting the sum of scores on additional questions that address only the tendency to be people-oriented. Each of these measures corresponds to the same overly simplistic case of a diagonal transformation underlying the Canguilhem method, except that now the L_1 norm

$$\nu' = \sum_{\ell=1}^{L} |\xi_\ell|$$

is used to reduce the L scores ξ_ℓ for each axis to a one-dimensional measure. In essence, the Blake Managerial Grid consists of two successive applications of the Canguilhem method, one for each axis.

In contrast, the Bowman patent application determines multiple values by aggregating the contributions of all factors to each of two (or more) orthogonal objective axes. That is, the Bowman method establishes first and second independent variables related to the value of an intangible asset, establishes a series of performance criteria statements probative of the value of those variables, scores each of the performance criteria statements, sums the scores to create first and second total scores, and plots those totals on a chart having a first axis relating to the first variable and a second axis relating to the second variable. These axes represent qualities that are (in general) external to the factors employed.

Neither Canguilhem alone nor the combination of Cangulihem and Blake would enable a person of ordinary skill in the art to practise the invention claimed in pending claims 1–4 and 6–20 of Bowman.

Neither Canguilhem alone nor the combination of Cangulihem and Blake would render obvious to a person of ordinary skill in the art the invention claimed in pending claims 1–4 and 6–20 of Bowman.

I wish to disclose that I am related to the inventor of the Bowman method, and it was through this relationship that I became aware of the Canguilhem patent. However, I have had no personal involvement in the development of the Bowman methodology, and I have no legal or financial interest in ProGrid Ventures Inc., the company that has the license to commercialize the Bowman method.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statement made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statement may jeopardize the validity of the application or any patents issuing thereon.

Further declarant saith not.

December 26, 2002
Date

John C. Bowman
Dr. John C. Bowman